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Alberta
Society
Bulletin

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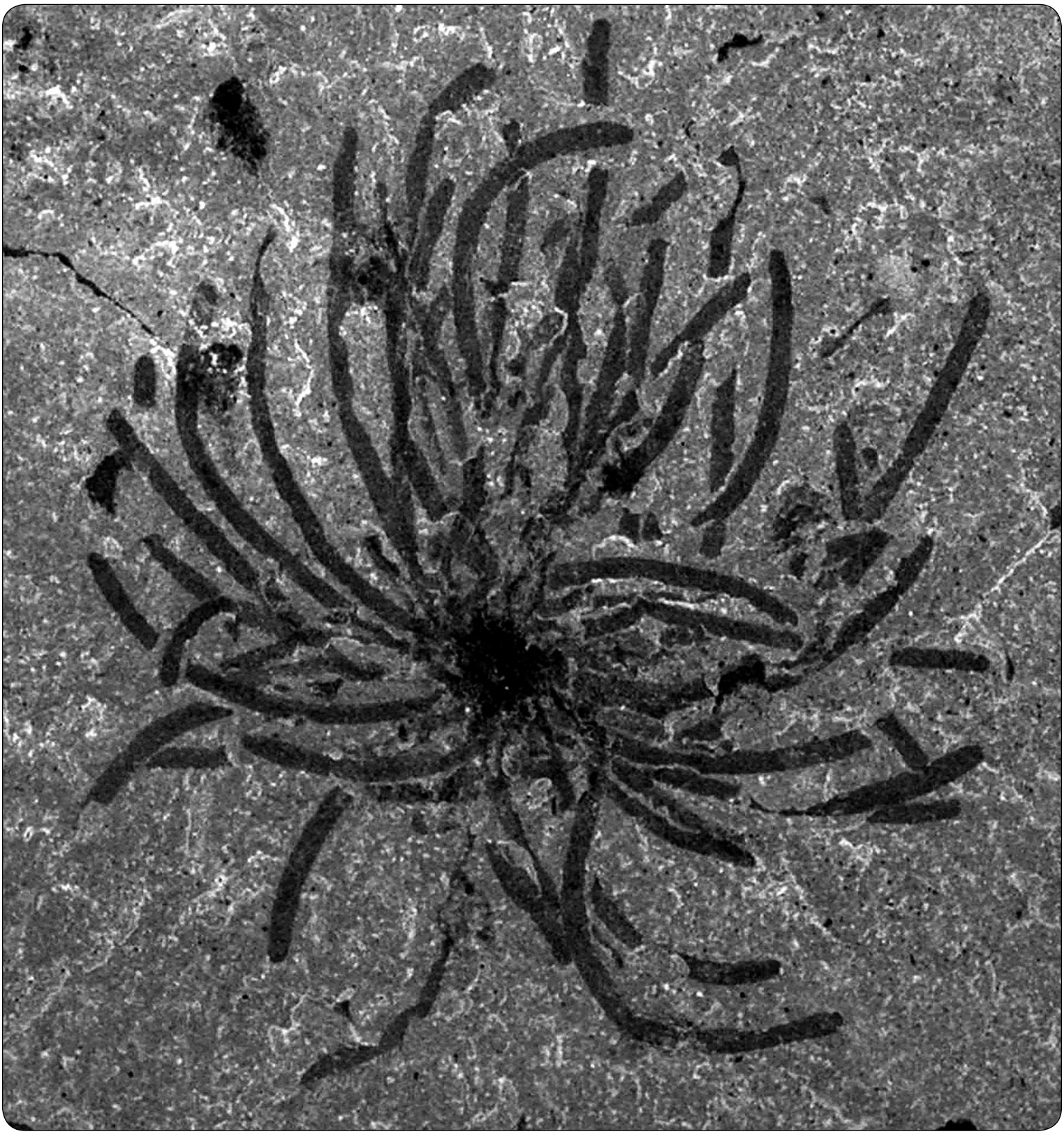

ALBERTA PALÆONTOLOGICAL SOCIETY

The Society was incorporated in 1986, as a non-profit organization formed to:

a. Promote the science of palaeontology through study and education.

b. Make contributions to the science by:
1) Discovery 2) Collection 3) Description
4) Education of the general public
5) Preservation of material for study and the future

c. Provide information and expertise to other collectors.

d. Work with professionals at museums and universities to add to the palaeontological collections of the province (preserve Alberta's heritage).

MEMBERSHIP: Any person with a sincere interest in palaeontology is eligible to present their application for membership in the Society. (Please enclose membership dues with your request for application.)

Single membership $20.00 annually
Family or Institution $25.00 annually

THE BULLETIN WILL BE PUBLISHED QUARTERLY: March, June, September and December. Deadline for submitting material for publication is the 15th of the month prior to publication.

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UPCOMING APS MEETINGS

Meetings take place at 7:30 P.M., in Room **B108**,
Mount Royal College: 4825 Mount Royal Gate SW, Calgary, Alberta.

See Pages 3 and 4 for details.

ON THE COVER: Another Cambrian "weird wonder" sees the light of day. The specimen was discovered this summer in the Lower Cambrian Eager Formation, near Cranbrook, BC. What sort of organism it represents is anyone's guess. Actual width of the field of view is 3.4 cm. The image was manipulated in Adobe Photoshop and rendered to black-and-white to maximize contrast between the specimen and the matrix. The specimen's true colour is shown at left. Specimen courtesy of Wendy Morrison, photo by Howard Allen. Copyright © 2007.

Upcoming Talks

September

Dr. Peter Dodson

University of Pennsylvania

Discovering Canada's Dinosaurs: Alberta's Gift to the World.

Thursday, September 20, 7:30 P.M.
Mount Royal College, Room B101
(opposite B108)

Note

October

Open House and Fossil Clinic

Friday, October 19, 7:30 P.M.
Mount Royal College, Room B108

The Alberta Palaeontological Society welcomes all Members, families and the general public to our annual Open House and Fossil Clinic. Members and guests are encouraged to bring specimens for display. Resident experts will be on hand to help identify fossils that are brought in to the clinic. Fossils found on the summer's field trips and expeditions will also be presented and discussed.

November

Ernie Lakusta

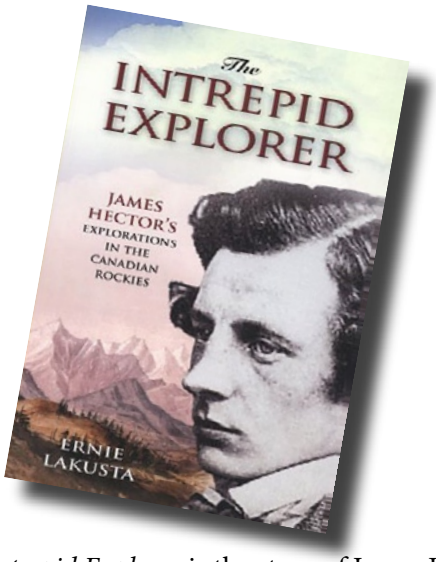
Calgary author

Sir James Hector: The Intrepid Explorer

Friday, November 16, 7:30 P.M.
Mount Royal College, Room B108

On January 13, 1858, a young medical doctor, barely twenty-three years old, passed over a high knoll known as Gabriel's Hill and got his first glimpse of the Rocky Mountains. His name was James Hector, the youngest member of the storied Palliser Expedition and this awe-inspiring sight would forever change his life.

In the next two summers this Intrepid Explorer would explore routes through and across the Rocky Mountains following a network of rudimentary trails relying on native guides for information. James Hector and his colleagues would brave bitterly cold winters, hot summers, unpredictable wildlife, personal conflict and Native war parties to explore these routes, often with only their wits to keep them alive. His is the first written account of crossing five major passes and it is an unparalleled story of adventure, hardship, perseverance and success.



The Intrepid Explorer is the story of James Hector's explorations in the Rocky Mountains from 1858 to 1860. I plan to take you on his incredible journey through the Rocky Mountains following in his footsteps, told through his eyes. We will travel the routes he pioneered, visit the passes he crossed and the mountains he named; inspect some of his detailed geological sketches and maps he created; witness his hardships and laugh at his follies. Above all, we will marvel at the indefatigable spirit of a true hero of Canadian history.

Biography

Ernie Lakusta was born in Hardisty, Alberta, in 1944, but was raised and educated in Calgary. He attended the University of Calgary, where he received his B.Ed., after which he became a high-school biology teacher and science department head for the Calgary Catholic School Board. Ernie's interest in the mountains grew out of his ecological research in Kananaskis Country in fulfillment for his M.Sc. degree from the U of C. An avid hiker and scram-

bler, Ernie's passion for the outdoors has led him to explore, photograph and write about the Rocky Mountains. His two previous books, *Canmore and Kananaskis: History Explorer* and *Banff and Lake Louise: History Explorer*, are products of his passion for the mountains.

Ernie lives in Calgary with his wife, Jean, his inspirational partner. His two daughters Cherelyn and Chrissy, son-in-law Joenel and new grandson Xavier share his love and freedom of the outdoors.

December

APS Christmas Social and Palaeo Photo Contest!

Friday, December 14, 7:30 P.M.

Mount Royal College, Room B108

Our December 14 session will consist of a potluck dinner at 7:30 P.M. sharp, followed by a palaeo slide show contest with prizes for the winners.

The contest categories

- Prepared specimens
- Fossils in the field
- Scenic shots
- Palaeo-humour

Submission rules

- Deadline is **December 10, 2007**—last day for receipt of pictures.
- Entries will be limited to 10 per member so be selective.
- Submitted files should be in JPEG, GIF or TIFF format and can be e-mailed to **philip.benham@shell.com**

If you don't have prints in digital format I can scan them for projection onto the screen.

Please mail prints to

Philip Benham
276 Rundlemere Rd NE
Calgary, AB
T1Y 3P7

Each photo should be documented with

- **Your name** (photographer must be an APS or CSPG member)
- **Contest category**
- **Picture title**
- **Photo location** (if relevant)
- **Geological information** (optional)

As each slide comes up the contributor may stand and give a brief comment on their photo with the understanding that the palaeo-humour may take slightly longer to set the stage.

The APS requests the privilege of using the winning entries to generate a fund raising product.

We are also looking for volunteers for a panel of "celebrity judges." Please contact me if you are interested.

Prizes are to be determined.

APS Social Director **Paul Dugan (403) 934-9599** will be coordinating the potluck portion of the evening. Any questions regarding the contest can be directed to me by phone or email.

APS Program Director
Philip Benham
Phone (403) 691-3343
E-mail: philip.benham@shell.com ❑

Dino tracks on bedding surface at Smoky River coal mine—by Phil Benham

Correction

The photographs on pages 4 and 5 of the June 2007 *Bulletin* of the "Rock-and-Fossil Clinic" at Fish Creek Library were wrongly attributed to Dan Quinsey. The photos were taken by **Dr. Sandy McCracken** of the Geological Survey of Canada, who we thank for his courtesy. The Editor apologizes to Dr. McCracken for the error. ❑

Library Notes

By Garren Dugan, APS Librarian

Hello Palaeofanatics! I hope everyone had a good summer. I know I did. Throughout my summer, I took the time to go through all the APS Library folders (containing bulletins of other societies, and palaeo-related articles) and reorganize them. In addition, I removed anything that was out of date. Although the outdated bulletins and articles are still available to view, they are not going to be at the APS meetings, due to the inconvenience of hauling them around. Lastly, to top things off, the following books have been donated:

December 15, 2006

Man's Place in Evolution, by British Museum (Natural History), Cambridge University Press, 1980.

January 19, 2007

Invertebrate Paleontology and Evolution, by E.N.K. Clarkson, 1979.

February 16, 2007

Geological Survey of Canada publications:

Ammonoid Faunas of the Upper Triassic Pardonet Formation, Peace River Foothills, British Columbia, Memoir 331, 1960.

Illustrations of Canadian Fossils: Cambrian, Ordovician and Silurian of the Western Cordillera, Paper 62-14, 1962.

Lower and Middle Devonian trilobites of the Canadian Arctic Islands, Bulletin 153, 1967.

Middle and Upper Triassic Spiriferinid Brachiopods from the Canadian Arctic Archipelago, Bulletin 155, 1967.

April 20, 2007 (donated by Wayne Braunberger)

Belize Complex: Step Model for Hydrocarbon Exploration, by Burr A. Silver, 1996.

Carbonate Cements, Edited by Nahum Schneidermann and Paul M. Harris, Society of Economic Palaeontologists and Mineralogists, Special Publication No. 36, April 1985.

The Southern Canadian Cordillera: Tectonostratigraphic Overview, Field Trip Guide by Unknown.

Carbonate Depositional Environments, Edited by Peter A. Scholle, Don G. Bebout, and Clyde H. Moore. Published by The American Association of Petroleum Geologists, Memoir 33, 1983.

The Deliberate Search for the Subtle Trap, Edited by Michael T. Halbouty. Published by The American Association of Petroleum Geologists, Memoir 32.

Applied Reservoir Architecture Field School, Field Guide to Pennsylvanian and Permian Outcrops of West Texas and New Mexico, by Baylor University Department of Geology.

Interpretation of Landforms from Aerial Photographs, by Nurettin Keser, Ph. D, Province of British Columbia Ministry of Forests.

Trace Fossils and Sedimentology of the Bearpaw-Horseshoe Canyon Formation Transition, East Coulee, Alberta, May 19, 2004.

CSPG Field Trip: Oil & Gas Pools of the Western Canada Sedimentary Basin, June 12, 1996

May 11, 2007

Encyclopedia of Dinosaurs, by Publications International Ltd., 2001.

Beyond The Dinosaurs, by Howard Zimmerman, 2001.

June 9, 2007

Journal of Vertebrate Paleontology (22 issues):

Volume 20, Number 2, 27 June 2000
Volume 20, Number 4, 19 January 2001
Volume 21, Number 1, 26 March 2001
Volume 21, Number 3, 22 August 2001
Volume 21, Number 3, Supplement
Volume 21, Number 4, 14 December 2001
Volume 22, Number 2, 8 July 2002
Volume 22, Number 3, Supplement
Volume 23, Number 1, 11 April 2003
Volume 23, Number 2, 17 June 2003
Volume 23, Number 3, 12 September 2003
Volume 23, Number 3, Supplement
Volume 24, Number 1, 25 March 2004
Volume 24, Number 2, 11 June 2004
Volume 24, Number 3, Supplement
Volume 25, Number 1, 11 March 2005
Volume 25, Number 2, 27 June 2005
Volume 25, Number 3, Supplement
Volume 26, Number 3, 11 September 2006
Volume 26, Number 3, Supplement
Volume 26, Number 4, 11 December 2006
Volume 27, Number 1, 12 March 2007 ❑

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Paleorangers Field Trip

July 7, 2007

Morrin Bridge and Horseshoe Canyon, Alberta

Article by Wendy Morrison

Co-leader Dan laces up for the big badland expedition. Photo by Wendy Morrison.

We had two parents and three kids show up for the paleorangers field trip—**Ken Roman** and his two boys, **Davis** and **Leland** and **Gary Solonynko** and his son **Matthew**. It turned out to be a successful trip.

It was raining at Drumheller and Horseshoe Canyon in the morning, making it impossible to hike down into the coulees. The dads and kids decided to try collecting for the morning at Morrin Bridge as it

Paleorangers assembled for the expedition into Horseshoe Canyon. Left to right: Matthew and dad Garry Solonynko; Leland, Davis and dad Ken Roman; co-leader Wendy Morrison. Photo by Dan Mislenovich.

looked clearer in the north and we all agreed to meet back at Horseshoe Canyon at 1:00 P.M.

The afternoon at Horseshoe Canyon was warm, 24–26°, and sunny. The kids had discovered an assortment of dinosaur bone at Morrin Bridge that morning and were quite pleased with how much they found.

Before we hiked into Horseshoe Canyon, leaders **Dan Mislenovich** and I gave the Paleorangers their certificates and each a box containing a fossil kit of specimens from all over North America.

Break time feels good during a long hike in the badlands. After a rainy start to the day, some sunshine garners smiles from the Solonynko crew. Photo by Wendy Morrison.

We then hiked down into the coulee. Steve Wolchina had suggested looking for *Ginkgo* leaves and other plant fossils but we decided to move on because we could not find the site—also, none of the kids were equipped with hammers to break the rock.

Massive hunk of dinosaur bone was a highlight of the hike. If Leland looks a bit smug, it's because brother Davis got stuck lugging the bone back to the car! Photo by Wendy Morrison.

We tried to hike as far as the oyster beds but they were too far away for the kids to hike. Along the way we did find some small pieces of dinosaur bone and fossil wood which the kids collected.

In the area where we stopped to turn around, the kids and parents found some oyster shells and small bits of bone on one hill. Dan found the big prize: a rather large and heavy end piece of a femur. After some discussion, Davis ended up with the prize. As long as he could carry it out, he could keep it.

Well, did he! Davis managed to carry the bone almost all the way out; his dad Ken took it the last few steps up the hill. Poor Leland was so tired and slowed down so much on the way back that Dan told him if he made it up the hill and back to the vehicles that we'd have an extra bag of fossils for him. Boy, did he move!

Matthew was getting tired hiking in the canyon but when we said it was time to head back, that really motivated him: from that point on, we had a hard time keeping up with him. All the boys did a really good job of hiking in and out of the coulees even though they were tired.

We got back to the vehicles around 4:30 P.M. The kids decided to look in their fossil kits and were quite delighted at the assortment of fossils we had in there for them. Everybody headed home after a successful day in the badlands. ❑

Field Trip Reviews

Trip 2007-1
June 22–23, 2007

Tolman Bridge, Alberta

Article by Howard Allen

Theropod tooth in the badlands. Photo by Mike O'Toole.

Our base of operations for *Tolman Bridge II: The Sequel* was the rustic camping area at the Lynch Ranch, on the west bank of the Red Deer River. The Lynch family offers public camping for a modest fee. Amenities are somewhat spartan, comprising three or four outhouses and some fire pits. The setting is appealing, being spacious, scenic and quiet. The biggest advantage, however, is its proximity to the Red Deer River badlands, an easy walk from the campsite via equestrian trails.

An advance party had arrived the Friday prior to our official field trip. **Ron Fortier** set a good example for us by finding a few microvertebrate fossils, including a nice *Troödon* tooth, just a short walk from the main camping area.

The weather Saturday morning was fine and sunny as the balance of our contingent arrived at the campsite. Following **Wayne Braunberger's** introductory explanation of the local geology, we headed north and dispersed into the badlands for a day of exploration in the upper Horseshoe Canyon Formation. As the year before, the badlands were decorated with an abundance of prairie wildflowers, all at their peak of perfection in mid-June, adding to the aesthetic quality of the setting.

Trail riders enjoy a sunny day in the Red Deer River badlands. Photo by Howard Allen.

Fossils are not particularly abundant in these badlands and participants got their money's worth in exercise and sunshine. Fragmentary dinosaur bones were the most frequently-seen fossils. Several members found theropod and hadrosaur teeth, mostly in broken and weathered

condition. **Linda Grady's** discovery of an assortment of sturgeon skull plates—a very unusual find in these rocks even with the best of luck—was rated as the discovery of the day.

Linda Grady finds sturgeon bones. Photo by Mike O'Toole.

Sunday's activities were informal and left to the whim of those who chose to stay for the second day. One group focussed their attention on the badlands south of the provincial campground, venue of the 2006 field trip; others headed off to the Morrin Bridge area, closer to Drumheller. The author accompanied **Doug and Tim Shaw** for a second day of exploring the badlands to the north of the Lynch campsite. The weather was once again perfect.

Theropod tooth in closeup view. This is the tooth seen in the photo on page 6. Photo by Mike O'Toole.

Within minutes of scrambling up the eroded slopes, Tim spotted two large, associated dinosaur ribs (probably hadrosaur), a weathered vertebra and an abundance of fragmentary material. Recognizing the significance of this find, we left the fossils as they were found and documented the locality. It was subsequently reported to authorities at the Royal Tyrrell Museum, who promised to examine the discovery (as of this writing, the status of the investigation is unknown). Several large theropod teeth in various states of preservation were found by our party, as well as a badly-weathered hadrosaur jaw fragment and the usual scattering of bone fragments.

Dinosaur rib discovered by Tim Carlielle-Shaw. This and an associated rib and vertebra were reported to the Royal Tyrrell Museum. Photo by Howard Allen.

Trip 2007-2
July 21–22, 2007

Cadomin area, Alberta

Article and photos by Howard Allen

The foothills region near the tiny hamlet of Cadomin, a former coal-mining town south of Hinton, was the venue for our second field trip. Leader **Wayne Braunberger** and the author were the first to arrive at the Whitehorse Creek campground south of Cadomin, on Friday afternoon, followed later in the evening by several other participants. A few others chose to overnight in Hinton.

We found the Whitehorse Creek campground to be a pleasant base of operations, though one wag was good enough to point out the irony of two geologists choosing to pitch tents on a floodplain and in the direct line of fall for a number of house-sized boulders

Field trippers negotiate one of the wooden trestles on the abandoned Cadomin-Mountain Park line.

looming precariously on the mountainside above. (It must be admitted that there was indeed precedent for concern, as one of said house-sized boulders was already sharing our campsite!) Despite any misgivings, we survived the night and awoke Saturday morning ready for our day of exploration.

Convening at a parking area next to the McLeod River and the Cardinal River Mine haul-road, a few kilometres south of the campground, we geared up and commenced our hike along the old Cadomin-Mountain Park railroad line, which winds its way down the valley toward Cadomin. The rail line was abandoned in the 1950s with all its rails, ties and trestles intact. The past half-century has not been kind, however, and what remains of the railroad includes a few reasonably well preserved sections of track and trestles, but many washed out, collapsed and overgrown stretches, making for an interesting hike that included some minor rock scrambling and bushwhacking.

The exposures along the old rail line and McLeod River form an intermittent record of the rocks ranging in age from Carboniferous through Jurassic.

Being good palaeontologists, we naturally started our examination at the bottom of the interval and worked our way back up through the section, in chronological and stratigraphic order. The rocks we examined were not very fossiliferous, but some palaeontological highlights were noted.

In the Triassic section we had a good look at the Mackenzie Dolomite Lentil, a member of the Sulphur Mountain Formation. The Mackenzie Dolomite is a heavily recrystallized coquina (that is, a shell bed) containing the leached-out moulds of bivalves and/or brachiopods and a few gastropods. The moulds and spaces between the old shells form a very porous network of holes that is much coveted in the oil industry as a petroleum reservoir rock. The Mackenzie Dolomite is equivalent to the "Triassic Coquina" of

MacKenzie Dolomite Lentil was a highlight for the petroleum geologists in the group. Here, Keith pries off a sample (detail at top) with leached pelecypod/brachiopod moulds showing excellent porosity and permeability.

This ammonite impression was one of the few fossils seen in the Jurassic section.

the Montney Formation, which hosts important oil and gas fields in the subsurface of west-central and northwestern Alberta.

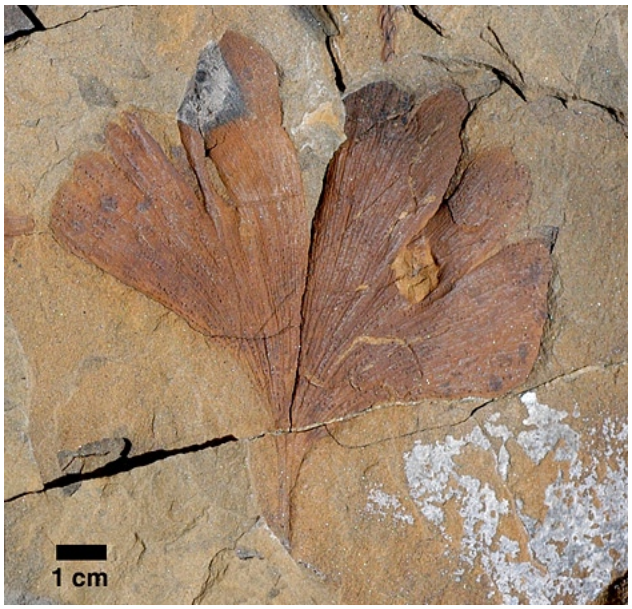
After lunching next to the railroad, we continued up-section through the Triassic Whitehorse Formation. The Starlight Evaporite Member, exposed in a tributary ravine, shows evidence of the solution of evaporite minerals (salts, gypsum, anhydrite) which led to the collapse of overlying beds and some geologically interesting structures. A short way further up this ravine was a bed of light coloured dolomite containing an abundance of fragmentary fish bones, preserved as typical bluish-black calcium phosphate. Despite a thorough look at many loose rocks, we were unable to find any good specimens.

A little further up-section we came to the base of the Jurassic which is represented here by massive, dark chert beds of the Nordegg Member and at one point along the McLeod River, some overlying black, papery shales were exposed at the bottom of the riverbank, probably equivalent to the "Poker Chip Shale" of the Fernie Formation. Here, **Aaron and Guy Santucci** got to work splitting slabs of shale and managed to score a decent lateral impression of a Jurassic ammonite. The Rock Creek Member of the Fernie Formation is also exposed in this area, forming several outcrops of resistant, fine-grained sandstone, which unfortunately produced no fossils; however, in the same area there was tantalizing evidence of richly fossiliferous beds in the form of several large boulders of muddy limestone, packed with bivalves, belemnites and ammonite fragments. The boulders were slightly to moderately stream-rounded indicating that they had been transported some distance, but we were unable to trace them to any nearby outcrops.

We topped off the day with a drive to the Cardinal River Divide, a windswept height of land south of the site of the former coal-mining town of Mountain Park. The Divide offers spectacular views of the mountains to the west and south, and foothills to the east. On our return to the campground we stopped to pay our respects at the Mountain Park Cemetery, which has been restored and maintained by volunteers, including the descendents of former Mountain Park residents.

Sunday's itinerary was an examination of Lower Cretaceous rocks of the Luscar Group, just outside of the hamlet of Cadomin. Exposures of the Gates and Gladstone Formations on cuts of the still-active CNR spur line were accessed by parking on the highway and wading the McLeod River. The Gladstone Formation contains a fairly rich assemblage of fossil plants. A few hours of scrounging the railroad cuts and some nearby waste piles turned up a number of good leaf impressions, including a variety of

Fern frond, probably *Cladophlebis* sp., from the Gladstone Formation at Cadomin.



***Ginkgo* sp.,** cf. *G. pluripartita* (Schimper) leaf in Gladstone Formation sandstone, Cadomin railroad section.

ferns, cycads, water plants and one nice *Ginkgo* leaf.

Due to the distance from home, our activities wound up around noon. Those of us who drove out past the Luscar mine operations got a final treat: a herd of bighorn rams posing next to the highway, against a spectacular Rocky Mountain backdrop, a fitting end to another excellent field trip.

[*More photos of the Cadomin field trip can be seen online at* **www3.telus.net/public/howallen/Cadomin/**]

Trip 2007-3
August 18, 2007

Burbank, Alberta

Article and photos by Howard Allen

The 2007 field trip season wrapped up with an expedition to the well-known Paleocene plant fossil locality at Burbank, north of Red Deer.

What happened to Genesee?

The August field trip was originally advertised as a re-examination of the Genesee fossil plant locality, site of a 1996 APS field trip. The reason for the change of venue is worth explaining, as it shows the research that sometimes must be undertaken prior to visiting fossil localities.

Our 1996 trip to the Genesee locality, situated on the right bank of the North Saskatchewan River southwest of Edmonton, involved a considerable bushwhacking effort of more than a kilometre each way through heavy undergrowth and over ground made swampy by beaver dams. Wishing to avoid a reenactment of the 1996 Death March, the author studied topographic maps and Google Earth satellite images in an effort to find an easier way in to the site.

In so doing, I was surprised to see on the 83-G/08 topographic map (published 1989) a small area immediately to the northeast of our intended target, marked as "Genesse [*sic*] Provincial Natural Area."

This discovery gave me a slightly uneasy feeling, knowing the Province's penchant for erecting "natural areas" that just happen to coincide with known fossil localities (other examples abound). Fears were confirmed when I Googled "Genesee Natural Area" and found a map on the government's Land Reference Manual site (**http://tprc.alberta.ca/parks/landreferencemanual/docs/natarea/GENESEE.PDF**) showing that the boundaries of the Genesee Natural Area had expanded (apparently circa 2001) to encompass the entire section of land on the south bank of the river, thereby placing our field trip locality

Timid dragonfly alights on a sandstone boulder at Blindman River. (OK, so what if it was dead as a doornail at the time?)

plunk in the middle of a protected area—in which fossil collecting is forbidden.

Wayne Braunberger, our field trip leader, was promptly alerted to this fact. This left us with a choice: find another locality near Genesee, or go directly to "Plan B." On a hunch, I looked up a Genesee locality that was described in an old rockhounds' guide (Nielson, c. 1970). It includes a map showing "X marks the spot" on a bend of the North Saskatchewan River about 5 km north of our 1996 venue. This looked promising: the rockhounds' guide rated it "an excellent site."

Aware that old rockhound guidebooks are notoriously inaccurate, I made a trip to the Gallagher

Library of Geology at the University of Calgary and found a copy of the most important paper written on the Genesee fossil flora, by Chandrasekharam (1974). This paper confirmed that the only Genesee fossil locality was, in fact, our old 1996 site, which has been known to palaeobotanists since at least the early 1950s (*e.g.* Brayton, 1953).

Chandrasekharam mentions no other sites in the Genesee area. It stands to reason that if there was another "excellent" plant fossil locality nearby, Chandrasekharam would surely have known about it, as he would have been doing his research right around the time that the rockhounds' guide was published. The result of this research was provided to Wayne, and it was therefore decided to go with "Plan B": Burbank.

Lunch time at the outcrop section on Blindman River. Marlstone and shale from the lower part of the section produce an abundance of Paleocene plant fossils.

As a "Plan B", the Burbank (Blindman River) site turned out to be a much better venue than Genesee in almost all respects. Certainly access was no problem: our group met at a convenient parking lot at the Burbank Park campground, just southeast of Blackfalds. From the parking lot, it was just a short walk along the riverbank to continuous and well-exposed outcrops on both banks of the Blindman River, above its junction with the Red Deer River. Other exposures are present on the Red Deer River itself. (By contrast the Genesee locality, even in 1996, was slumped and mostly overgrown, with almost no exposed outcrop.)

Well-preserved carbonized leaf impressions are abundant in the slabs of shale and marlstone (limy mudstone) that have fallen from the steep banks of

A huge but badly weathered fossil tree stump is exposed on the right bank of the Blindman River.

Leaf fossils preserved as carbon films are typical of the flora found at Burbank. Conifer leaves, probably *Glyptostrobus* sp.

Leaf venation in close-up view shows the remarkable preservation of many of the Burbank specimens. Detail of a large, strap-like leaf, possibly *Zingiberopsis* sp.

the Blindman River. The rocks exposed here belong to the Lacombe Member (Demchuk and Hills, 1991) of the Paskapoo Formation. This is, in fact, the type area of the Paskapoo Formation (*pas-ka-poo* is Cree for "blind man"; Holmgren & Holmgren, 1976), described by J.B. Tyrrell—yes, *that* Tyrrell—in 1887.

The ringing of rock hammers soon echoed throughout the valley as our contingent of a dozen or more members explored the riverbanks, turning up many good specimens. The weather was nearly ideal for hunting and hammering, being overcast and cool, but with no threat of rain.

A second interesting "fossil" occurrence was noted at this locality. Accompanied by Wayne and **Geoff Barrett**, the author explored a short distance north along the bank of the Red Deer River, below the mouth of the Blindman. An abundance of small freshwater pelecypod shells was noted along the banks of the river.

At first it was assumed that they were recent shells washed up from the river, but further observation revealed many specimens lying on the scree, several metres above river level. A scramble up the bank finally traced the source of the shells—as well as those of larger unionid clams—to a gravel bed at the top of the bank, some 10 m above the present river level. The shells are therefore probably thousands of years old, dating to a time well before the river had cut down to its present level. ❑

Old shells or fossils? Readers can decide for themselves. Freshwater bivalves recovered from a gravel bed approximately 10 m above the present level of the Red Deer River.

References

Brayton, D.M. 1953. Cretaceous flora of Genesee. Unpublished MSc thesis, Department of Geology, University of Alberta, Edmonton.

Chandrasekharam, A. 1974. Megafossil flora from the Genesee locality, Alberta, Canada. Palaeontographica, Abteilung B, Paläophytologie, no. 147, p. 1-47.

Demchuk, T.D. and Hills, L.V. 1991. A re-examination of the Paskapoo Formation in the central Alberta plains: The designation of three new members. Bulletin of Canadian Petroleum Geology, vol. 39, no. 3, p. 270-282.

Holmgren, E.J. and Holmgren, P.M. 1976. Over 2000 place names of Alberta, third edition. Western Producer Prairie Books, Saskatoon, p. 30.

Nielsen, G.L. (undated, c. 1970). A rockhound's guide to Alberta. Self-published, p. 25.

Paleo 2008

Our 12th annual palaeontological symposium runs Saturday and Sunday March 15 and 16, 2008 at Mount Royal College.

Watch for details in the December Bulletin.

Start planning now!
APS Members who would like to contribute displays or posters should contact Roslyn Osztian at (403) 256-6648.

Exploration and Discovery in Northwest Alberta's Peace Country

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Photography by Katalin Ormay

The Palaeontological Society of the Peace (PSP) is pleased to report on the fieldwork completed during the 2007 field season. An extensive geological mapping and stratigraphical study of the Wapiti Formation (Cretaceous: Campanian–Maastrichtian) was conducted by Federico Fanti of the University of Bologna, Italy.

In addition, a series of new palaeontological discoveries was made by Federico Fanti and by Dr. Philip Currie and his team from the University of Alberta. Several known fossiliferous localities were examined and proved richer than previously thought. A large portion of the Wapiti River valley was prospected, as well as significant outcrops along the Red Willow and Smoky rivers, and Pinto Creek.

More detailed results of this field season will be presented at the Ceratopsian Symposium in Drumheller [September 22–23, 2007] by Federico Fanti and Dr. Philip Currie as posters and short announcements. Highlights of the 2007 field season include:

- The first comprehensive survey of the Wapiti Formation.
- A microfossil site discovered.
- Opening of the Wapiti River bonebed ("Charlie Young bonebed").
- Two new dinosaur bone sites uncovered.

Geological mapping and stratigraphic analysis of the Wapiti Formation

The first extensive study of the Wapiti Formation in the region has enabled a better understanding of the 1,300 m-thick package of rock.

Basin geometry, structure and evolution

In the Grande Prairie region, the Wapiti Formation can reach an overall thickness of 1,300 m. Because of isolated and discontinuous outcrops confined along the major creeks and rivers, correlation between different localities is virtually impossible. However, the presence of several marker beds (Figure 1), especially bentonites—volcanic ash layers—and a three-dimensional reconstruction of the entire sedimentary basin obtained using geophysical data from 548 well logs, allowed a reliable division of the Wapiti Formation into sub-units that have been correlated with age equivalent deposits of Alberta and Alaska.

Figure 1. 2.5 m-thick bentonite layer outcropping along the Wapiti River. This substantial layer can be traced in well logs for hundreds of kilometres to the west.

Age and correlation to other rocks in the Province

Because of its great temporal extent, the Wapiti Formation is equivalent to several well-known formations of central and southern Alberta, all known for their abundance of fossil vertebrates and diversity of dinosaur taxa.

Several geological and palaeontological approaches have been combined in order to document the entire Wapiti succession in detail and to correlate regional units to age equivalent deposits elsewhere.

Particularly, lacking any marine depositional

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Figure 2. Assorted microfossils from a newly discovered site east of Grande Prairie. Pictured is Tetsuto Miyashita who found the first lizard skull. Top to bottom: lizard limb-bone elements, theropod (*Troödon*) tooth, juvenile hadrosaur vertebra.

Uninterrupted terrestrial record

A four million year old "gap" existed when northwest Alberta was terrestrial while the rest of North America was covered by marine environments. One of the most remarkable aspects of the Wapiti Formation is its uninterrupted terrestrial record that extends from 80 to 67 MYA. During the Bearpaw transgressive event, the vast majority of Alberta was under tropical waters of a shallow inland sea. But to the northwest, alluvial plains and forests were still available for herds of dinosaurs. Consequently, Bearpaw equivalent rocks and fossils found in the Wapiti Formation represent a unique record of that particular time that is not found elsewhere in the province and probably in most of North America.

event, the Wapiti Formation plays a unique role in the stratigraphic evolution of the western margin of the Western Interior Seaway as well as in dinosaur dispersal and palaeobiogeography. Radiometric ages from volcanic ashes, pollen analysis and combined research on magnetostratigraphy and petrography will allow an extremely detailed correlation of the Wapiti Formation deposits.

Sedimentological analysis

Sedimentological analysis reveals clues to the depositional environment, explaining bone deposition. In the Peace country, fossil vertebrate remains are recovered in bonebeds, as isolated skeletons and in microfossil sites, as a result of different depositional environments. Sediment analyses provide a variety of information, including environment, flora, climate and taphonomy, providing a better comprehension of extinct ecosystems.

Palaeontology

Numerous new vertebrate fossil sites were found in the Wapiti Formation. The new finds will be properly accessioned and mapped over the next year. Highlights of the finds are:

Microvertebrate site

A newly discovered microvertebrate site has produced four complete skulls and several cranial and postcranial elements of lizards. The skulls[1] are very unique and will be prepared and studied by palaeontologists from the University of Alberta.

Until the discovery of the Pipestone Creek pachyrhinosaur bonebed by Al Lakusta in 1972, the Grande Prairie area was known for sporadic occurrences of scrappy dinosaur bones and one lizard jaw that C.M. Sternberg mentioned in a 1951 publication

[1] Photos of the lizard skulls have been withheld from publication at the request of the first author –*ed.*

(Sternberg, 1951). The lizard bones pictured here (Figure 2) were collected from the same locale as Sternberg's. Lizards of this era (73 MYA) have been known from only one other site in North America. In addition to the lizard skulls, numerous other microfossils were uncovered:

- *Troödon* sp. teeth
- *Paronychodon* sp. teeth
- Turtle shell fragments
- Ceratopsian and hadrosaur teeth
- Crocodile teeth and postcranial remains
- Juvenile hadrosaur bones (vertebrae, phalanges)

This fossil association, together with a peculiar geological setting, suggests that a nesting area could have been located near the present day Grande Prairie area at approximately 73 MYA. Further study will be done to verify this hypothesis. The presence of lizards indicates a unique faunal assemblage and climatic conditions in the area.

Figure 4. *In situ* pachyrhinosaur skull elements in the Charlie Young site bonebed.

Wapiti River bonebed (Charlie Young site)

This site has been known locally for decades. In the past, landowner Charlie Young invited interested school groups to this outcrop located on his land. To honour him, we now refer to this location as the "Charlie Young site."

The majority of Dr. Philip Currie's time was spent at this *Pachyrhinosaurus* bonebed. He and his team conducted a test excavation (Figure 3) to determine the richness of the bonebed, to judge the number of individual animals present and to collect significant bones for further study.

Figure 3. The test excavation quarry of the Charlie Young site along the Wapiti River.

The *in situ* level of the bonebed was confirmed. The extent of the bonebed is more than 100 m in length, confirmed by bones at the expected elevation levels. A radiometric dating of the underlying bentonite layer will provide a precise age of these fossils.

In addition to the three skulls collected from the site in the previous years, seven new (partial) skulls were uncovered and collected, confirming the animal as *Pachyrhinosaurus* (Figure 4).

Considering the stratigraphic position of this bonebed (170 m higher than the Pipestone Creek bonebed), its estimated younger age (approximately 70.4 MYA) and preliminary analyses on skull elements collected, there is a good possibility that the Charlie Young site contains a new, different species of *Pachyrhinosaurus*.

Other sites on the Wapiti River

Abundant hadrosaur material was discovered and collected from a site on the Wapiti River (Figure 5).

Indication of a possible theropod site was discovered at yet another site along the Wapiti River. In spite of not being able to explore the entire outcrop, abundant vertebrate fossils were collected. The site needs further study.

Pipestone Creek bonebed

No official work was done. However, visits to the site showed that bones are still plentiful. A unicorn horn was collected from a previously worked section of the bonebed.

Figure 5. Assorted hadrosaur bones from a newly discovered location along the Wapiti River.

Acknowledgements

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Reference

Sternberg, C.M. 1951. The lizard *Chamops* from the Wapiti Formation of northern Alberta: *Polyodontosaurus grandis* is not a lizard. Bulletin of the National Museum of Canada, no. 123, p. 256–258.

[*See photographer Katalin Ormay's wonderful work at* **www.flickr.com/photos/34379736@N00/** *-ed.*] ❑

Western gear was the Alberta team's official uniform for the science fair held in Truro Nova Scotia, this year. Part of Timmy's award-winning display appears in the background. Photo credit: Youth Science Foundation Canada.

APS Member Wins Science Fair Prize

Congratulations to Timmy Carlielle-Shaw on capturing a Bronze Medal in the Earth & Environmental Sciences (Junior) category of the Canada-Wide Science Fair held this spring in Truro, Nova Scotia.

Tim's project, *Chromatography and Organic Components of Cretaceous Fossils* was the same one he presented at the APS Symposium in March of this year. The win netted him a $300 cash prize and a $1,000 University of Western Ontario entrance scholarship.

Timmy, starting Grade 8 at Deer Meadow School in Olds, has won "Best of Fair" for central Alberta at the elementary level, two years in a row and has entered science fair competitions for the last six years.

Well done, Tim! ❑

Fossils in the News

Calgary Herald, July 6, 2007, p. A3

Fossil of massive sea beast found

LETHBRIDGE—Workers at the Korite International ammonite quarry (Bearpaw Formation, 70 MYA) near Lethbridge have unearthed another important vertebrate fossil, this time an elasmosaur (long-necked plesiosaur). Heavy equipment operators spotted a bone in their excavator bucket and stopped work while experts from the Royal Tyrrell Museum were called to investigate. **Dr. Don Henderson** of the Museum enthuses that "it's the most complete [elasmosaur] from western Canada."

The specimen was excavated by museum staff over a period of three weeks and removed to the museum in three large plaster casts weighing over "9,000 tonnes" [*sic*; presumably 9,000 kg, or 9 tonnes]. They are hoping that an intact skull will be recovered with what may be a complete skeleton. Dr. Henderson estimates that the specimen will be ready for display in about two years.

Science News, April 21, 2007, p. 243.

Forest primeval: The oldest known trees finally gain a crown

NEW YORK—Palaeobotanists have brought together the parts of two previously-known fossils to reveal the true identity of Earth's oldest-known trees. Stumps of an unknown tree, dubbed *Eospermatopteris* had been known from quarries in upstate New York since the 1870s. The fossils are dated to 385 MYA (Middle Devonian). Branches and "leaves" (actually finely subdivided branchlets that produce a "bottle brush" appearance) of a plant named *Wattieza* had also been known for some time as fossils in rocks of the same area.

In 2005 a new specimen was found that includes *Wattieza* branches attached to an *Eospermatopteris* trunk. Researchers estimate that most "trees" would have been in the range of 8 m tall, but some much larger stumps would have represented even taller specimens. The findings were reported in the April 19, 2007 issue of *Nature*.

Science News, June 16, 2007, p. 371.

Big and birdlike: Chinese dinosaur was 3.5 metres tall

BEIJING—Bones of an enormous, newly discovered dinosaur have been unearthed in northern China. 70 million-year-old *Gigantoraptor* was related to the oviraptors, but was much bigger, measuring up to 8 m in length and weighing an estimated 1.4 t, compared to its 40 kg *Oviraptor* cousins.

Palaeontologist Xing Xu and colleagues have recovered limb and tail bones and portions of the animal's jaw and backbone. When they found the first bone, Xu's team speculated that it belonged to a sauropod, but it soon became evident that this was a different creature entirely. Analysis of the bone microstructure suggests that *Gigantoraptor* grew much faster than other dinosaurs and the proportions of its leg bones indicate a fast runner. The fossil is described in the June 14, 2007 issue of *Nature*.

New Trail (University of Alberta alumni magazine), Summer 2007, p. 36.

The lizard king

EDMONTON—This short article relates U of A palaeontology professor Michael Caldwell's research on a Cretaceous (100 MYA) fossil lizard that was found in an Italian museum cabinet in 1996.

The fossil is of a marine lizard found in a Slovenian limestone quarry. The fossil's significance is that it preserves an elongate body with relatively large, but vestigial rear legs. Caldwell, who studies the evolution of lizards and snakes, was surprised to see such a feature in a marine reptile. The loss of legs in snakes was assumed to have occurred with a line of terrestrial snake ancestors, and the discovery of a parallel condition in a sea-going lizard "was unsuspected," says Caldwell.

Dr. Caldwell and Italian researcher Alessandro Palci published their research in the March 2007 issue of the *Journal of Vertebrate Paleontology*.

Science News, January 27, 2007, p. 53.

Ancient glider: Dinosaur took to the air in biplane style.

CHINA—A 125 million-year-old feathered dinosaur, *Microraptor gui*, may have used a biplane wing configuration to glide from tree to tree, according to research conducted by palaeontologist Sankar Chatterjee (Texas Tech University) and engineer R. Jack

Templin (retired, Ottawa).

Fossils of *Microraptor* show long feathers attached to the animal's legs. The feathers have shafts situated near the leading edges of the feathers, a shape that is characteristic of flight feathers. The scientists propose that *Microraptor* held its legs below and to the rear of its body as it flew, allowing the long leg feathers to project sideways, forming a second "wing" below its primary wings—in the manner of a biplane. Other features of the animal's skeleton suggest that it wasn't a powerful flier and probably could not have taken off from the ground.

CBC News online, September 5, 2007

Alberta fish fossil points to ancient link to Mediterranean

GRANDE PRAIRIE—A fish fossil that was found in a core taken from a well south of Grande Prairie may provide evidence for a marine connection between the Alberta and Mediterranean (Tethys Sea) of 96 million years ago. The fish, a new genus and species, was named *Tycheroichthys dunveganensis*. Its name means "lucky fish of the Dunvegan": lucky because the entire specimen (missing only the very tips of a few fins) fits perfectly within the circumference of the 8.3 cm diameter core.

Tycheroichthys was a small, deep-bodied fish—similar in shape to an angelfish—whose nearest relatives have been found in rocks from as far away as Lebanon, Morocco and Brazil. One palaeogeographic theory supposes that a seaway may have connected the Western Interior Seaway of North America, where *Tycheroichthys* lived, to the Mediterranean region, through Hudson Bay. More evidence will be needed before this theory can be fully tested.

The specimen was spotted in a core of the Dunvegan Formation at the Alberta Energy and Utilities Board core storage facility in Calgary by geology student Michael Hay. A paper describing the find is published in the June 2007 issue of the *Canadian Journal of Earth Sciences.*

BBC News online, June 26, 2007

Tropical giant penguin discovered

PERU—Remains of *Icadyptes salasi*, a 1.5 m tall penguin, have been found in southern Peru along with fossils of up to four other undescribed penguin species. The giant penguin had a long, spear-like beak and lived in waters that were tropical at the time, 36 million years ago (late Eocene). The discovery challenges the prevailing idea that penguins evolved in high latitudes (closer to the south pole) with some species, like the Galapagos penguin, only recently spreading to warmer waters.

CBC News online, September 12, 2007

Remains of ancient beast found in NWT permafrost

TSIIGEHTCHIC, Northwest Territories—Shane Van Loon, out for a walk along the riverbank in this settlement on the Mackenzie River, 100 km south of Inuvik, noticed something odd protruding from the permafrost. A closer inspection revealed the frozen remains of an extinct bison that may have roamed the area 20,000 years ago. Van Loon was able to recover the skull (with a one-metre horn spread), hooves, a leg, shoulder blades, part of the spine and even some preserved internal organs and stomach contents. He notified officials of his find.

Grant Zazula, a Yukon government palaeontologist was planning to visit the site. According to Zazula, the Mackenzie Delta area was covered in ice during the last ice age, which suggests that the bison would have been buried prior to the last ice age, which ended about 10,000 years ago. ❑

[*Thanks to Georgia Hoffman and Phil Benham for collecting clippings and* URLs *–ed.*]

Burgess Shale Conference Set for 2009

The International Conference on the Cambrian Explosion (ICCE) is in the works for August 3–7, 2009, at Banff. The conference is dubbed *Walcott 2009* and has been timed to coincide with the 100th anniversary of the discovery of the Burgess Shale by C.D. Walcott. The Conference includes pre- and post-event field trips to the Burgess Shale (Walcott Quarry) and Mount Stephen Trilobite Beds in Yoho National Park.

Registration requires that you take accommodation at the Banff Centre for the four days of the Conference, open to all comers. See **www.geology.utoronto.ca/facultycaron/Walcott2009.htm** ❑